

2/1/18

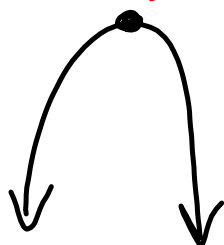
"Challenges are what make life interesting and overcoming them is what makes life meaningful."
-Joshua J. Marine

HW: "Reflecting Parabolas" Homework section
Test 1 on Thursday 2/15

AIM: How do we recognize reflections of Parabolas?

Warm Up:

1) What is the vertex of the equation $f(x) = -(x+3)^2 - 32$?



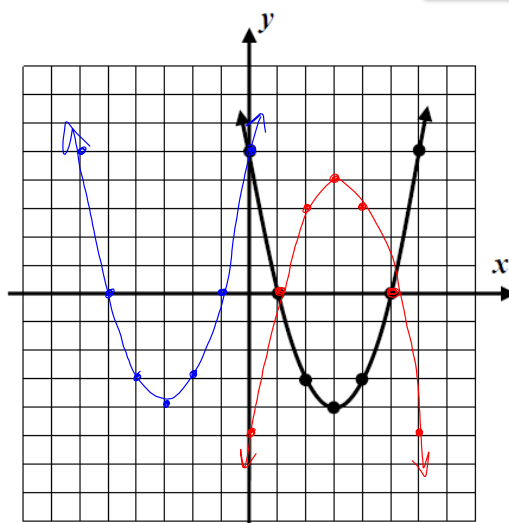
$$f(x) = x^2$$

$$(-3, -32)$$

turning point

$$\begin{array}{r} @ (0,0) \\ -3-32 \\ \hline -3, -32 \end{array}$$

Exercise #1: The parabola $f(x) = x^2 - 6x + 5$ is shown on the grid below.



- (a) Consider the function $g(x) = -f(x)$. Determine a formula for $g(x)$ and graph it on the grid below.

$$g(x) = -(x^2 - 6x + 5)$$

$$g(x) = -x^2 + 6x - 5$$

- (b) How was the graph of f transformed to produce the graph of g ?

Reflected $f(x)$ over the x -axis to get $g(x)$
 (y -values change)

- (c) Now consider the function $h(x) = f(-x)$. Determine a formula for $h(x)$ and graph it on the grid above.

$$h(x) = (-x)^2 - 6(-x) + 5$$

$$h(x) = x^2 + 6x + 5$$

- (d) How was the graph of f transformed to produce the graph of h ?

Reflected $f(x)$ over the y -axis to get $h(x)$
 (x -values change)

REFLECTING FUNCTIONS IN THE X AND Y AXES

outside

The function $-f(x)$ is a reflection of $f(x)$ in the x -axis. (y-value change)The function $f(-x)$ is a reflection of $f(x)$ in the y -axis. (x-value change)

inside

Exercise #2: Determine an equation for the linear function $g(x) = 5x - 7$ both after a reflection in the x -axis and y -axis. Label your equations.

$$g(x) = 5x - 7$$

reflect over x -axis

$$-g(x) = -(5x - 7)$$

$$= -5x + 7$$

$$y = -5x + 7$$

$$g(x) = 5x - 7$$

reflect over y -axis

$$g(-x) = 5(-x) - 7$$

$$= -5x - 7$$

$$h(x) = -5x - 7$$

Exercise #3: If a parabola has the equation $f(x) = 2x^2 - 3x + 8$, which of the following represents its equation after a reflection in the x -axis?

(1) $y = 2x^2 + 3x + 8$ (3) $y = -2x^2 + 3x + 8$

(2) $y = -2x^2 + 3x - 8$ (4) $y = 2x^2 - 3x - 8$

$$-f(x) = -(2x^2 - 3x + 8)$$

$$= -2x^2 + 3x - 8$$

Exercise #4: After a reflection in the y -axis, the quadratic function $g(x) = 4x^2 - 7x + 2$ would have the equation

(1) $y = -4x^2 + 7x + 2$ (3) $y = 4x^2 + 7x + 2$

(2) $y = -4x^2 + 7x - 2$ (4) $y = 4x^2 + 7x - 2$

$$g(-x) = 4(-x)^2 - 7(-x) + 2$$

$$= 4x^2 + 7x + 2$$

Exercise #5: Consider the function $g(x) = -x^2 + 4$. What two transformations have occurred to the graph of $y = x^2$ to produce the graph of g ? Specify the transformations and the order in which they occurred. Note that there exists more than one correct answer. Graph on your calculator to verify.

$$g(x) = -x^2 + 4$$

Both are "Outside"

① reflect over x -axis

② up 4 units